

LYCAENID BUTTERFLIES (LEPIDOPTERA: LYCAENIDAE) OF BRISBANE: NEW FOOD PLANT RECORDS AND LIFE HISTORY NOTES

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Abstract

Information is provided on 19 lycaenid species found in metropolitan Brisbane, southeast Queensland. Thirty-one new larval food plants are recorded for 9 species. Also included are life-history notes and/or records of lycaenids breeding within the inner city and suburban areas of Brisbane.

Introduction

Sixty-three butterfly species in the family Lycaenidae occur in the Greater Brisbane Region (defined by Poole 1995) of southeast Queensland, according to distribution data in Braby (2000). The rich diversity of butterflies occurring in the region has been attributed to its varied forest types and has been recognised due to a relatively high collecting effort (Kitching and Dunn 1999). Suburban areas support a large proportion of this diversity. Twenty-nine lycaenid species were recorded from a Mt Coot-tha garden (Hill and Kitching 1983), whilst breeding records of De Baar (1994) and Hill (1987) suggest suburban gardens and bushlands support a diverse and interesting lycaenid fauna. However, some suburban areas, particularly new developments isolated from natural habitat, support only a few common lycaenid species (Hill and Kitching 1983).

The following food plant list provides new records and/or life history notes for several lycaenids of metropolitan Brisbane. These records are additional to those of Braby (2000), who provided an extensive list of food plants and life-history details for the Australian lycaenid fauna. Species that breed in highly modified environments such as the City centre are identified.

Collecting focused on the southern and western suburbs and in the Brisbane City centre (George St, Ann St, North Quay and South Brisbane). New food plants are annotated under each species heading and known food plants are also listed where life-history information is given. Months indicate collection times of larvae and/or pupae. Nomenclature for butterflies follows Braby (2000). Attending ants collected during this study will be reported elsewhere.

Results

Hypochrysops cyane (Waterhouse & Lyell)

Amyema miquelii (Loranthaceae). Inala, Indooroopilly. Jan., Aug. 1999-2000. Larvae and pupae collected from beneath cardboard bands attached 3-4 m from the ground on the trunk and branches of *Eucalyptus seeana* and *E. tereticornis* (Myrtaceae). Larvae failed to develop on the eucalypt foliage, but did accept and develop normally on foliage of *A. miquelii*, which heavily

parasitised both trees. *Amyema miquelii* is a known food plant of *H. cyane* at Warwick, Qld (Braby 2000). A single tree at each site was utilised by *H. cyane* over successive generations, while other trees nearby with similar infestations of *A. miquelii* were not used. Pupae of *Ogyris oroetes* (Hewitson) and *O. olane* Hewitson were found together with *H. cyane* at both sites. Larvae collected in August produced adults in October, while larvae and pupae collected in January produced adults in February.

Ogyris oroetes oroetes (Hewitson)

Amyema miquelii (Loranthaceae). Indooroopilly, St Lucia, Corinda, Rocklea, Inala, Gales, Acacia Ridge, Browns Plains and Eight Mile Plains. Jan.-May, Aug. 1999-2000. At least three generations were detected including late-summer (adults emerging from February to early March), autumn (adults emerging throughout May) and spring (adults emerging from August to September). Additional generations are likely to occur as adults have been collected or reared in all months (Braby 2000). Larvae feed on fresh young growth which is produced throughout the year. Pupal duration was 12 days in March-April, 23 days in August-September and 43 days in July-August. During winter the larval duration of the spring generation was 60-70 days. *Amyema miquelii* is a known food plant of this species (Braby 2000) and is a common parasite of *Eucalyptus tereticornis* and other *Eucalyptus* spp. in the above suburbs.

In Brisbane and elsewhere in southern Queensland, larvae are green and closely match the food plant foliage in colour. On two occasions (at Warwick and Leyburn) immature 4th and 5th (final) instar larvae were collected on *A. miquelii* foliage during the day. Common and Waterhouse (1981) reported green larvae feeding during the day at Mitchell. This behaviour may be more prevalent (at least in southern Queensland) than has previously been recognised. Immature larvae were never found sheltering during the day under bark near the mistletoe or near the base of the host tree as reported by Braby (2000), although mature (post-feeding) larvae and pupae were regularly found in these situations.

Ogyris olane Hewitson

Amyema miquelii (Loranthaceae). Indooroopilly, Rocklea, Inala, Gales, Acacia Ridge, Browns Plains and Eight Mile Plains. Feb.-Mar., May, Aug.-Sep. 1999-2000. Three generations were collected. Pupal duration of the late summer generation was 10 days (February), spring generation 22 days (September), winter generation 38 days (June-July). An additional early summer generation may occur, but further collecting in November and December is required to confirm this. *Amyema miquelii* is a known food plant of *O. olane* (Braby 2000). Immature larvae sheltered under bark close to the mistletoe haustorium, while mature larvae and pupae were often found with those of *O. oroetes* under bark near the base of the host tree.

Ogyris amaryllis amaryllis (Hewitson)

Amyema cambagei (Loranthaceae). Wolston Ck (Wacol), Oxley Ck (Corinda), Moggill Ck (Brookfield), Pullen Pullen Ck (Pinjarra Hills), Aug.-Jan. 1999-2000. Common along watercourses wherever the food plant is locally common. Captive larvae accepted and developed normally on another common mistletoe, *A. miquelii*, but despite a considerable search effort no early stages were found on this plant in the field. This subspecies is known to feed only on *A. cambagei* throughout its range (Braby 2000) and our results support its monophagous status.

Rapala varuna (Horsfield)

Jagera pseudorhus (Sapindaceae). Sherwood Arboretum, Apr. 2000. Single mature larva feeding on flowers. Larva was pale yellow with pink markings.

Eriobotrya japonica (Rosaceae). Sherwood, Apr. 2001. Two mature larvae and several immature larvae and eggs found on flower buds and flowers.

Alphitonia excelsa (Rhamnaceae). Oxley Ck (Corinda), Toohey Forest, Dec. 1999 to Jun. 2000. Numerous larvae were found on flowers of this well-known food plant in all months from December to June, representing two or three generations. Pupal duration was 10 days in December-January, 16 days in March-April and 30 days in May-June.

Deudorix diovis Hewitson

Arytera foveolata (Sapindaceae). Oxley Ck (Corinda) and Moggill Ck (Kenmore), Nov. 1999 to Jan. 2000. Numerous larvae found in fruits. Mature larvae are partly exposed while feeding on seeds as the fruit lobes are smaller than the larva itself. Pupae were attached to leaf litter near the base of trees.

Cupaniopsis parvifolia (Sapindaceae). Oxley Ck (Corinda) and Sherwood, Nov., Dec. 1999. Numerous larvae found feeding on seeds and inner fruit wall.

Harpullia hillii (Sapindaceae). South Brisbane, Oct. 1999, 2000. Several mature larvae found feeding on fleshy inner wall of fruit capsules; seeds not present. Development was completed normally on fruit capsules.

Macadamia integrifolia (Proteaceae). Sherwood, Corinda, Mt Gravatt, South Brisbane, Oct. to Jan. Numerous larvae in 1999-2000, few in 2000-01. Larvae feed and complete development on the outer rind of fruit when the inner seed hardens. Pupae were found in hollowed branches and in cracks on the trunk. *Macadamia* is known as a food plant of *D. diovis* in Queensland (Braby 2000), although the species involved have not formerly been identified.

Macadamia tetraphylla (Proteaceae). St Lucia, Jan. 2000 & 2001. Evidence of larval feeding on fruits and several pupae found in crevices on lower trunk.

Larvae were also recorded on the known food plants *Harpullia pendula*, *Cupaniopsis anacardioides* (Sapindaceae), *Buckinghamia celsissima* (Proteaceae) and *Elaeocarpus angustifolius* (Elaeocarpaceae) in suburban Brisbane. *D. diovis* is common throughout Brisbane as a result of the use of these plants as street trees. *Harpullia pendula* trees were heavily colonised even in the City centre (George St and South Brisbane).

A second instar larva was discovered in the fruit of *Diploglottis campbelli* (Sapindaceae) collected in February 2000, from the Tallebudgera district. This larva was reared to the final instar but failed to pupate. Four hatched *D. diovis* eggs were found on fallen fruits of *Diploglottis australis* at the Sherwood Arboretum in October but no larvae were found and there was little indication of larval feeding on these fruits. Four larvae (instars I, II and III) were experimentally reared on *D. australis* fruit and, although all developed to the final instar (and two pupated), none survived to produce adults.

Larvae were successfully reared from second instar to adult on *Syzygium australae* (Myrtaceae) and *Jagera pseudorhus* (Sapindaceae) fruits, but early stages were not found on either in the field. Likewise, *Eriobotrya japonica* (Rosaceae) seeds are accepted by captive larvae (Waterhouse 1932) but we found no evidence that *D. diovis* will oviposit on these fruits in the field.

Candalides margarita (Semper)

Amyema miquelii (Loranthaceae). Rocklea, Apr., May 1999. Eggs, discovered singly on young shoots in late April, produced adults in July. Larval duration was 38-39 days in May-June. Pupal duration was 41-42 days in June-July. A single mature larva was found feeding on foliage at mid-day during April. Larvae fed along leaf edge leaving no distinctive feeding trail and were well camouflaged on the foliage.

Candalides absimilis (C. Felder)

Harpullia pendula (Sapindaceae). Herston, Feb. 2000. Two larvae were found feeding on flowers in the company of numerous *Catopyrops florinda* (Butler) larvae. *Candalides absimilis* was reported ovipositing on *H. pendula* shoots in Brisbane (Braby 2000) and the present record confirms *H. pendula* as a food plant.

Cupaniopsis anacardioides (Sapindaceae). South Brisbane, Feb. 2001; Springwood, Jan., Oct., Dec. 2000. This is a well-known food plant of *C. absimilis* and several larvae were found feeding on tender foliage close to the City centre in February. The larvae were in the company of larvae of *Nacaduba berenice* (Herrich-Schäffer) which are more common on this plant in inner City locations.

Stenocarpus sinuatus (Proteaceae). Sherwood Arboretum Apr. 2000. Eggs and two pink larvae found on flowers.

Nacaduba berenice (Herrich-Schäffer)

Cupaniopsis anacardioides (Sapindaceae). Coopers Plains, Aug. 2000. Several mature larvae feeding on immature fruits. *Nacaduba berenice* normally feeds on fresh foliage or flowers of this plant (Braby 2000).

Cupaniopsis parvifolia (Sapindaceae). Oxley Ck (Corinda) and Sherwood, Apr. 2000. Eggs and numerous larvae found feeding on tender, young foliage.

Elatostachys nervosa (Sapindaceae). Mt Coot-tha Botanical Gardens, Apr. 2000. Eggs and numerous larvae found feeding on soft, pink foliage.

Elatostachys microcarpa (Sapindaceae). Mt Coot-tha Botanical Gardens, early Nov. 2000. Tree native to northern Queensland. Numerous larvae were found on flowers and immature fruits. Most larvae were seen feeding on immature fruits as few flowers remained.

Arytera foveolata (Sapindaceae). Oxley Ck (Corinda), Dec. 1999. Eggs and numerous larvae of all stages feeding on tender, young foliage. All new growth was stripped from some heavily colonised, small trees.

Jagera pseudorhus (Sapindaceae). Sherwood Arboretum, Apr. 2000. Three mature larvae found feeding on flowers in the company of *Erysichton lineata* (Murray) larvae.

Nacaduba berenice is common throughout suburban Brisbane (Braby 2000, this study). In the City centre, larvae were regularly found feeding on tender, young foliage of *C. anacardioides*. Larvae were recorded on this plant in January, February, March, April, July, August, September and October. Pupal duration on this plant was six days in January, 13 days in April-May, and 9 days in September. Larvae were also found on other known food plants: *Macadamia integrifolia* (flowers, Sherwood, Aug. 2000), *Arytera divaricata* (tender foliage, Sherwood, Apr. 2000) and *Guioa ?acutifolia* [unconfirmed: Qld Herbarium] (tender foliage, Oxley Ck, Dec. 2000).

Early stages were not found on *Harpullia pendula* despite searching many trees. Rearing experiments with six larvae showed that they refused to feed on tender young shoots of this plant, but would develop normally on the flowers. A search of *Toechima tenax* (Sapindaceae) at Brisbane Botanical Gardens and at Moggill Ck revealed no immature stages, even when soft, fresh growth was abundant and larvae were found nearby on other food plants. The reason for avoidance of this plant in the field is unknown as larvae fed and developed normally on it in captivity.

Nacaduba biocellata (C. Felder & R. Felder)

Acacia disparrima subsp. *disparrima* (Mimosaceae). Rocklea, May 2000. Two larvae feeding on flowers in the company of more numerous *Prosotas felderi* (Murray) and *Sahulana scintillata* (T.P. Lucas) larvae.

Erysichton lineata (Murray)

Brachychiton acerifolium (Sterculiaceae). Sherwood Arboretum, late Oct. 2000. A single mature larva was found feeding on flower buds. The larva was bright green and conspicuous against the red buds.

Jagera pseudorhus (Sapindaceae). Sherwood Arboretum, Apr. 2000. Two larvae found on flowers in the company of larvae of *Nacaduba berenice*. Larvae were cream with pink dorsal and dorso-lateral stripes.

Miscarytera lauteriana (Sapindaceae). Mt Coot-tha Botanical Gardens, Jul. 2000. Three mature larvae found feeding on flowers.

Elatostachys microcarpa (Sapindaceae). Mt Coot-tha Botanical Gardens, early Nov. 2000. Tree native to northern Queensland. Numerous mature larvae were found feeding on flowers in the company of *Nacaduba berenice* larvae.

Alectryon subcinerius (Sapindaceae). Mt Glorious, Nov. 2000. Numerous larvae found feeding on flowers. Not a suburban record, but this tree does occur along creeks in Brisbane.

Harpullia pendula (Sapindaceae). Sherwood Arboretum, Dec. 2000, Feb. 2001. A single mature larva was found feeding on flower buds in December, while two first instar larvae were found on flower buds in February. A prepupal larva was found attached to a dead leaf caught in a trunk fork in February. *Erysichton lineata* has previously been reported ovipositing on flowers of *H. pendula* (Braby 2000) and the present records confirm it as a food plant.

Syzgium francisii (Myrtaceae). Oxley Ck (Corinda), late Oct. 2000. Several eggs, three first instar and one second instar larvae found and reared on flower buds.

Pupal duration was 6 days in February, 8-9 days in April and May and 7 days in November and December.

Psychonotis caelius (C. Felder)

Alphitonia excelsa (Rhamnaceae). Oxley Ck (Corinda), Toohey Forest, early Nov. to early July. A well-known food plant throughout the range of this species. In addition to feeding on the underside of leaves, larvae were found and reared on the flowers. Outside of the period recorded above, the foliage was old and dry and no larvae were found.

Alphitonia petriei (Rhamnaceae). Mt Coot-tha Botanical Gardens, Apr. 2000. Several larvae found feeding on the underside of foliage. Recently recorded as a food plant in northern Queensland (Braby 2000).

Prosotas felderi (Murray)

Acacia disparrima subsp. *disparrima* (Mimosaceae). Rocklea, May 2000. Numerous larvae found feeding on flowers.

Acacia falcata (Mimosaceae). Toohey forest, Jun. 2000. Three larvae found feeding on flower heads.

Acacia concurrens (Mimosaceae). Toohey Forest, Jun. 2000. Numerous larvae found feeding on flowers.

Harpullia pendula (Sapindaceae). Sherwood Arboretum, Dec. 2000. A single larva was found feeding on flower buds.

Prosotas dubiosa (Semper)

Acacia maidenii (Mimosaceae). Sherwood Arboretum, Apr. 2000. A single larva was found feeding on flowers.

Alectryon tomentosus (Sapindaceae). Sherwood Arboretum, Dec. 2000. An adult male was reared from a pupa attached to leaf litter accumulated in the fork of a large flowering tree.

Harpullia pendula (Sapindaceae). Sherwood Arboretum, Feb. 2001. A single larva was found feeding on flower buds in the company of *Erysichton lineata* and *Catopyrops florinda* larvae.

Catopyrops florinda (Butler)

Harpullia pendula (Sapindaceae). Herston and City centre, Apr. 2000; Benwarra Park (Corinda), Feb. 2000; Rocklea, Mar. 1999. Numerous larvae found feeding on flowers at Herston and several found in the City centre. Two mature larvae were feeding on terminal shoots at Benwarra Park. A pupa was found inside a hollow *H. pendula* fruit capsule previously eaten out by *Deudorix diovis* at Rocklea. Braby (2000) recorded *H. pendula* as a food plant near Brisbane. This is the only lycaenid currently known to feed on *Harpullia* foliage in Brisbane, although flowers are preferred when both are available.

Sahulana scintillata (T.P. Lucas)

Acacia disparrima subsp. *disparrima* (Mimosaceae). Rocklea, May 2000. Numerous larvae found feeding on flowers.

Acacia maidenii (Mimosaceae). Oxley Ck (Sherwood), Jun. 2000. Three mature larvae feeding on flowers.

The site of pupation for this species is unrecorded. A freshly emerged male was found expanding its wings on exposed tree roots several metres from the base of the food plant. It is likely (though unconfirmed) that this individual emerged from a pupa on the ground.

Lampides boeticus (Linnaeus)

Macroptilium atropurpureum (Fabaceae). South Brisbane, Corinda, Oct. to Nov. 2000. Females observed ovipositing on flowers. Eggs were found on most flowers examined. Several mature larvae were recovered from flower buds.

An adult female was observed ovipositing on flower buds of *Bauhinia galpinii* (Caesalpiniaceae) at South Brisbane in January, 2000. No larvae or evidence of feeding were seen on the plant. Approximately 10 eggs were collected on *B. galpinii* flower buds and brought into captivity but none of the resulting larvae survived beyond the first instar. Newly hatched larvae were observed to tunnel through the calyx but failed to feed on the inner flower. About 20 eggs were found on buds of the same plant in November 2000 and again larvae failed to develop. The known larval food plants of *L. boeticus* are restricted to the Fabaceae (Braby 2000) and it appears that oviposition on *B. galpinii* was a mistake.

Leptotes plinius (Fabricius)

Plumbago auriculata (Plumbaginaceae). Larvae are common on this known food plant throughout Brisbane, including the City centre (e.g. George St). At Sherwood larvae were found in all months of the year as the plant flowers continuously.

Zizina labradus (Godart)

Neonotonia wightii (Fabaceae). South Brisbane, Sep. to Oct. 2000. Numerous eggs and larvae were found on flowers. Braby (2000) listed this plant as *Glycine wightii*.

Discussion

Braby (2000) provided the most recent and comprehensive listing of larval food plants for the Australian Lycaenidae. The 31 additional food plant records presented here are mostly within plant genera or families which are known food plants of these butterflies. Exceptions include the records of *Erysichton lineata* feeding on *Brachychiton acerifolium* (Sterculiaceae) and *Rapala varuna* feeding on *Eriobotrium japonicum* (Rosaceae). The full host plant range of many lycaenid species remains to be documented. *Deudorix diovis*, *Candalides absimilis*, *Nacaduba berenice* and *Erysichton lineata*, for example, each use a wide range of food plants in the Sapindaceae and it is likely that additional food plants will be added as a greater range of plants in this family are investigated.

The diversity of rainforest plants in the Sapindaceae in southeast Queensland (48 species in the Moreton District: Henderson 1997) and the variation among species in flower and foliage production throughout the year, make this group an important resource for some continuously brooded lycaenids.

Erysichton lineata for example, although not restricted to the Sapindaceae, can be found utilising flowers of a variety of species in this family at different times of the year. The ability to feed on a wide range of plants in this family (and others) therefore enables certain species to remain in the area and complete multiple generations annually.

All lycaenid species included here tolerate human disturbance and breed on garden or street trees or on plants occurring in remnant patches of bushland. Seven species were found breeding on street trees, garden plants or weeds in or close to the central business district of Brisbane (*Deudorix diovis*, *Nacaduba berenice*, *Candalides absimilis*, *Catopyrops florinda*, *Leptotes plinius*, *Lampides boeticus*, *Zizina labradus*). These common species were also recorded in suburban Townsville (Valentine 1993, 1994) and elsewhere in suburban Brisbane (Hill and Kitching 1983). Urbanisation has possibly increased the availability of food plants for some or all of these butterflies. For example, several *D. diovis* food plants are now common street trees throughout Brisbane and the butterfly has consequently expanded into drier areas in which it could not have formerly bred.

Preservation of natural bushland remnants and remnant riparian habitats is clearly important for the maintenance of local populations of other lycaenid species whose food plants are not well represented in urban landscapes. Retention of large mistletoe-supporting trees is important for the continued presence of mistletoe-feeding species. Three mistletoe-feeding species, *Ogyris amaryllis*, *O. oroetes* and *O. olane*, not formerly thought of as suburban butterflies, are shown to be well distributed through Brisbane in areas where food plants remain. Each of these species is also known from suburban Townsville (Valentine 1993, 1994).

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